



US005317323A

United States Patent [19][11] **Patent Number:** **5,317,323****Kennedy et al.**[45] **Date of Patent:** **May 31, 1994**[54] **PASSIVE HIGH ACCURACY GEOLOCATION SYSTEM AND METHOD**[75] **Inventors:** **Joseph P. Kennedy, Fairfax; Christopher D. Roller, Burke; Robert W. Hooper, Arlington; all of Va.**[73] **Assignee:** **E-Systems, Inc., Dallas, Tex.**[21] **Appl. No.:** **26,782**[22] **Filed:** **Mar. 5, 1993**[51] **Int. Cl.⁵** **G01S 3/02**[52] **U.S. Cl.** **342/457; 342/357; 342/465**[58] **Field of Search** **342/357, 457, 387, 389, 342/465**[56] **References Cited****U.S. PATENT DOCUMENTS**

3,996,590 12/1976 Hammack .
 4,494,119 1/1985 Wimbush 342/457
 4,740,792 4/1988 Sagey et al. 342/457
 4,742,357 5/1988 Rackley 342/457
 4,791,572 12/1988 Green, III et al. 342/457
 4,797,679 1/1989 Cusdin et al. 342/387

4,884,208 11/1989 Marinelli et al. 342/351
 4,888,593 12/1989 Friedman et al. 342/387
 4,916,455 4/1990 Bent et al. 342/457
 5,008,679 4/1991 Effland et al. 342/353

Primary Examiner—Theodore M. Blum
Attorney, Agent, or Firm—Rogers & Killeen

[57] **ABSTRACT**

A system for accurately locating a mobile cellular radio includes plural radio receivers, the position of each being precisely known, a satellite-based time source for providing the actual time of arrival of a radio signal at the plural radio receivers, and a device for removing multipath and cochannel interference from the received signals so that actual time of arrival of the radio signal may be determined accurately. The Global Positioning System (GPS) may be used to provide the time signal and to provide the precise location of the plural radio receivers. The system may be used to passively determine the location of the mobile radio and is accurate enough to use with a computer generated map system.

31 Claims, 6 Drawing Sheets